A REPORT

ON

TELEVISION IN BASIC TRAINING:

THE IMPROVEMENT OF BASIC TRAINING BY TELEVISION

Audio Visual Communications Directorate
Office of the Chief Signal Officer

Report prepared by:

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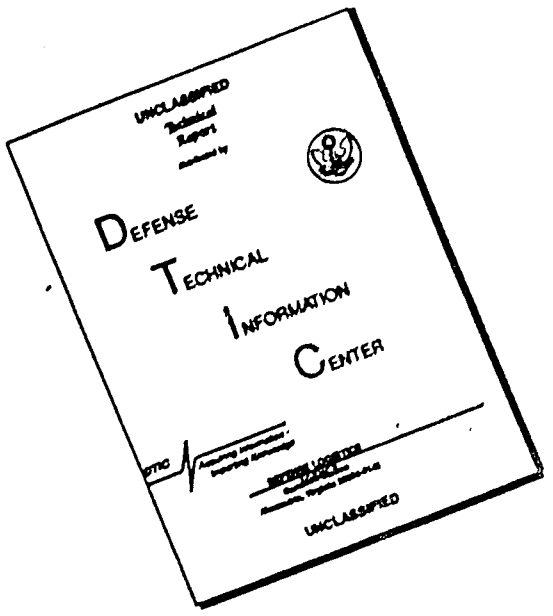

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SUMMARY OF RESULTS

The results of the study may be summarized as follows:

(1) The comparisons between the television company and the primary conventional company, based on immediate test scores indicated:

a. Television instruction was in most comparisons more effective than conventional instruction.

b. Television instruction was more effective both for low and high aptitude groups.

c. Prior to the end of basic training, Review-Preview had already eliminated deficiencies indicated by the immediate tests for the TV Company.

(2) Comparisons between the television company, (based on final test scores), with conventional companies indicated:

a. The learning of the television company was superior to that of the conventional companies.

b. The learning of the lower aptitude television trainees was at least as effective as the learning of the higher aptitude conventional company trainees.

c. The superior performance of the television company appears attributable to the review-preview procedure.

(3) Administratively, the use of television eliminated requirements for 165 man hours of live instruction. It was determined that this elimination could be extended to 254 hours which could be presented by television.

(4) Additional advantages of television were:

a. Standardization of training at an effective level.

b. Mobilization requirements for additional instructors are reduced or eliminated.

c. New training requirements can more easily be incorporated, e.g., review opportunities, new subject matters, changes in scheduling, etc.

Television in Basic Training

I. Introduction.

In June 1953, the then Office, Chief of Army Field Forces, and the Office of the Chief Signal Officer sponsored the first Army television training study.[1] Its purpose was to provide information bearing upon two possible applications of television contemplated by the Army: (1) Mass training during emergency situations including conditions of full mobilization; (2) Routine training in Army schools and installations.

The study was carried out by the Human Resources Research Office, George Washington University, at the basic training center, Fort Gordon, Georgia. Fourteen hours of representative instruction were selected for conversion to television presentation. These presentations were a duplication of the classroom instruction. A company of basic trainees received part of their training by viewing these fourteen hours of instruction over television. They were tested immediately after this instruction as well as at the end of basic training, and were then compared with trainees from a conventional basic training company.

The major conclusions stemming from this study were:

a. Television instruction was at least as effective as regular instruction.

b. Television instruction was remembered at least as well as regular instruction.

The study concluded that: "....should conditions require the Army to adopt a mass medium of instruction such as television, instruction of the types used in this study could be presented by television with the strong assurance that there would be no loss in learning effectiveness."

This first study was primarily concerned with the teaching effectiveness of television and only incidentally with the administrative implications of the full scale use of television in basic training. At that time, the major form of television presentation was "live." It was also possible to film these presentations. These films or "kinescopes" could then be projected over a television system or with a conventional motion picture projector. However, the

[1] Kanner, J. H., Runyon, R.P., and Desiderato, O. Television in Army Training: Evaluation of Television in Army Basic Training. Human Resources Research Office, The George Washington University. Nov. 1954.

later development of recording television information on magnetic tape, video tape recording, greatly expanded the flexibility and value of television in military training.

Although the area of basic training provided the first test of Army television, priority was subsequently given to the application of television to the training problems of the Army's technical schools. The result was that in succeeding years, television facilities were acquired by many of these schools. Until 1962, television was never again employed in Army basic training.

In 1961, the President issued a mobilization order in response to the Berlin crisis. One of the effects of this order was to increase the number of trainees at existing installations and to require the activation of new training facilities. Existing shortages of qualified instructors and training materials were aggravated by this increased training mission. It was at this time that the Chief Signal Officer, calling attention to the 1953 study, recommended to the Deputy Chief of Staff for Operations that consideration be given to a full scale application of television to meet this situation. After discussion of various requirements for a proposed evaluation, approval was given to carry out a full scale test of television at the U. S. Army Basic Training Center, Fort Dix, N. J.[2] A study plan was developed by the Office of the Chief Signal Officer outlining the purpose of the study and a description of procedures to be employed.[3]

Objectives of Study.

To evaluate the use of television in basic training. This evaluation would include an effort to improve the level of instruction and to determine the equipment and cost factors related to a full scale use of television for basic training.

Design of Study.

To obtain information on the study's objectives, the following design and procedures were developed. Two companies entering basic training at the same time at Fort Dix were selected. These companies

[2]Letter, DCSOPS to CONARC, subject: Television in Basic Training, and 1st Indorsement thereto, dated 17 Nov 61.

[3]Letter, OCSigO to DCSOPS, subject: Television in Basic Training, dated 2 Apr 62.

were formed from a pool of incoming trainees. These trainees were then assigned to the two companies on the basis of their AFQT scores so that on a man to man basis, the companies were similar in trainee aptitude.* One company was designated as the television (TV) company, and the other as the conventional (C_1) company, and these are referred to as the "primary" companies. During the eight weeks of their basic training, every time the TV Company entered a classroom, it received its instruction by television. The conventional company (C_1) received its instruction as ordinarily given by regular instructors at Fort Dix. Immediately after the television or regular instruction, both companies were tested to see how much they had learned. In addition to these individual tests, a two-part final test, measuring overall knowledge of basic training, was administered at the end of the eight weeks of training. Table 1 illustrates the design of the study and the training and testing procedures employed.

Other conventional companies were selected and tested to obtain additional information. These are referred to as "secondary" companies. For example, to obtain information on the training level achieved by companies which did not know they were in a comparative study, other companies were tested at Fort Dix, Fort Jackson, South Carolina, and Fort Ord, California. Table 2 lists the various companies used and their purpose.

"Review-Preview"

A television teaching procedure, labeled "review-preview," was used to evaluate a use of television to enhance trainee performance in basic training. In the 1953 Fort Gordon study, television films or kinescopes had been used for review purposes at the end of basic training with excellent results. A review and preview procedure had been employed in a previous basic training study.[4] In the HumRRO study:

> "The Prevue-Review consisted of a mimeographed, condensed summary of all material that would be taught each day. A copy of this summary was given to each man on the night before the training was to take place. For 45 minutes every evening, the men gathered in groups of about 20, with one of the trainees selected by the company commander in charge. The men read over the summary of the next day's material and were then given a verbal quiz on the contents by the man in charge. A short discussion of the material followed. The following day, the... men took their Preview-Review sheets to their various classes... Each man was thus able to check the lecturer's statements against the mimeographed outline and write in his notes, additions or comments." (4, p.9).

*The Armed Forces Qualification Test is considered an excellent measure of trainee learning ability.

[4]Cline, V.B., Beals, A., Sedman, D., Evaluation of Four-Week and Eight-Week Basic Training for Men of Various Intelligence Levels., Human Resources Research Unit No. 2, CONARC, Fort Ord, Calif. Tech Report 32, Nov. 1956.

TABLE 1

Training, Matching and Testing Conditions for Primary Companies

TV Company N = 156

Trng: 58 Classroom Hours by Television
30 Hours "Review-Preview"

	AFQT RANGE	MEAN AFQT
Group 1	100 - 84	91.95
Group 2	83 - 67	77.17
Group 3	66 - 50	57.71
Group 4	49 - 32	39.31

TESTS

1. 25 Individual Subject Matter Tests
2. Fort Dix Performance Tests
3. Final End of Training Tests

Conventional Company (C_1) N=156

Trng: As Ordinarily Given at Fort Dix

	AFQT RANGE	MEAN AFQT
Group 1	100 - 84	91.95
Group 2	83 - 67	77.17
Group 3	66 - 50	57.71
Group 4	49 - 32	39.31

TESTS

1. 25 Individual Subject Matter Tests
2. Fort Dix Performance Tests
3. Final End of Training Tests

TABLE 2

Experimental Basic Training Companies and Their Employment

Company	Location	Training and Testing Administered
Primary		
Television (TV)	Fort Dix	58 hours daytime television; 10 hours tv review-preview; 25 individual tests, final and pictorial tests.
Conventional C_1	Fort Dix	Conventional daytime instruction; 25 individual tests; final and pictorial tests.
Secondary		
Conventional (C_2)	Fort Dix	Conventional instruction. 7 individual tests.
Conventional (C_3)	Fort Dix	Conventional instruction; final and pictorial tests.
Conventional (C_4)	Fort Ord	Conventional instruction; final and pictorial tests.
Conventional (C_5)	Fort Ord	Conventional instruction; final and pictorial tests.
Conventional (C_6)	Fort Jackson	Conventional instruction; final and pictorial tests.
Conventional (C_7)	Fort Jackson	Conventional instruction; final and pictorial tests.
Conventional (C_8)	Fort Dix	Conventional instruction by same cadre as TV company. Final and pictorial tests.

The modifications of this technique, as developed in the present study, reflect some of the advantages of television recordings. Television receivers were placed in the barracks of the TV company. After hours, the trainees were presented with up to one hour of information by means of television recordings. There was a review of the previous day's or week's instruction in which the key points were emphasized by the television instructor. Often, parts of the original instruction were shown in this review. There was also a prevue of forthcoming events. For example, trainees were shown what occurred on the grenade range, rifle range or at the gas chamber. It was believed this procedure would improve trainee performance in these situations, and perhaps reduce anxiety.

In the prevue portion, other basic training companies, in later stages of training, were shown in such activities as drill and marching with the purpose of providing goals to the trainees of the television company. Brief talks by the Deputy Commanding General, Fort Dix, were also presented. Finally, in the last week of basic training, a review of key points of information and the major concepts taught in the first eight weeks of basic training was given.

The prevue material did not cover the specifics of classroom instruction. Thus the television company had no advantage over the conventional company in this respect.* The review-preview came into effect the following night when the previous day's instruction was reviewed. This means that the daily tests were measuring the effects of the daily classroom instruction while the end of course final tests would in addition measure the cumulative effects of the review-preview procedure.

Instructional Personnel.

There are three groups of instructor personnel engaged in the training of the companies at Fort Dix. The first group, company cadre, consists of enlisted personnel who stay with a particular company throughout the eight weeks of training. They teach most of the physical skills in the field and give additional instruction in the barracks or to informal groups in the field. The second group is referred to as the Post Faculty Group, and the third as Regimental Faculty group. Post Faculty instructors teach the more complex subjects as M-14 assembly and disassembly, while such subjects as Military Courtesy and Supply Economy are taught by Regimental instructors.

*By not covering the specifics of classroom instruction, a clearer picture of the contribution of review could be obtained. In actual training situation, it would be possible and desirable to cover the specifics of forthcoming classroom instruction.

Unlike the cadre personnel, the other instructor groups are generally limited in their contact with trainees in the classroom. It was the Post and Regimental instructors who were replaced by television in this study and were used when converting classroom instruction to television.

Selection of Subject Matters for Television Presentation

The Army Training Program, ATP 21-114, which was in effect during this study, provided the source of instructional material. The materials selected for conversion to television were those ordinarily taught in the classroom or of a lecture-demonstration nature. There was no substitution of television for activity subjects and television did not add to the sedentary nature of basic training.

The basic guide in selecting instructional material for conversion to television was whether it was formally taught in a classroom. In addition, some skills taught in the field were preceded by periods of lectures and demonstrations. While these periods were considered adaptable to television, the problem of presenting this instruction out in the field or bringing the trainees to a classroom could not be solved in the time period of this study. The total sum of hours of instruction in basic training, following the ATP is 384. Of this number, 82 were judged suitable for television instruction. Because of the administrative factors just mentioned, 58 out of the 82 hours were converted to television instruction. An interesting feature was the inclusion of the M-1 rifle disassembly instruction for television.* In this use, the trainees disassembled and assembled their rifles while following the television instructor. (Table 3 lists subject matters selected or adapted to television instruction.)

In addition to the 58 hours of instruction selected from the ATP, there was a requirement for the production of 30 hours of instructional material for use in review-preview. This material, it will be recalled, was used for presentation to the TV company trainees in their barracks, afterhours.

*There was a requirement for assembly-disassembly instruction on the newer M-14 rifle. Within three days, a television recording on this subject was produced at the Army Pictorial Center.

TABLE 3

ARMY TRAINING PROGRAM (ATP 21-114)
FORT DIX ARMY TRAINING PROGRAM

SUBJECT	TV* HOURS SELECTED	POTENTIAL** TV HOURS	TOTAL HOURS	NIGHT TNG HOURS
Administrative Processing				
CG Orientation		3	3	
CO Orientation		1	1	
Unit in Processing			2	
Enlistment Orientation	1		1	
Records Check			2	
Unit Out Processing			4	
Immunization			2	
Safety		2	2	
Activity Day			16	
Achievements & Traditions	2		2	
Military Courtesy	4		4	
Character Guidance	4		4	
Code of Conduct	2		2	
Military Justice	6		6	
Supply Economy	2		1	
Troop Information	2		2	
Army Drill			25	
Field Sanitation	2		2	
First Aid	3		8	
CBR Warfare	3	2	8	
Guard Duty	4		4	
Inspection & Training Evaluation	1		22	
Intelligence	4		4	
Physical Training			11	
Close Combat (Individual Battle Action)			3	
Infiltration Course			3	(1)
Individual Day and Night Training		3	6	(4)
Marches and Bivouacs		3	8	(4)
Rifle Squad Tactical Training		3	14	(3)
Technique of Fire			8	
Grenades		3	8	
Trainfire M-1 and M-14 Rifle	14		81	
Night Firing and Night Vision		1	4	(5)
Bayonet Training			8	
Hand to Hand Combat		1	8	
Proficiency Test			4	
Land Navigation	3		10	(3)
Land Mine Warfare		2	4	
Counter Insurgency Training	2		2	
Commanders Time			55	
	58	24	364	20

TOTAL: 384 Scheduled ATP Hours (Experimental)

*Actual Hours-Training Hours which were recorded and presented via tv during basic cycle. **Potential Hrs - Training hrs which are normally taught in a classroom or could be presented by television.

Preparation of Television Instruction

The guidelines for preparation of the 58 hours of television instruction were not as restrictive as those used in the 1953 study. In that study, it was mandatory that every attempt be made to avoid enhancing television instruction so as to gain a valid measure of the comparative teaching effectiveness of television and regular instruction. Since it was the purpose of the present study to evaluate some of the administrative and learning advantages permitted by television, attempts at improving television instruction, as compared to the classroom instruction upon which it was based, were permissible.

However, the relatively short time period available did not provide much opportunity for improvement. Nor was there the opportunity, based on test results, to go back and improve the television instruction after it was recorded. There was an attempt to introduce such effects as "superimposures" to visually reinforce key teaching points, a rest pause about half way through the instruction and closeups of small parts or equipments. In one or two instances, an attempt was made to stimulate trainee interest by dramatizing introductory material. But there was not enough time for systematic use of these techniques, and some hours of television instruction were faithful duplicates of classroom presentations.

In the procedure employed in this study, the existing lesson plan was the basis of the television instruction. Fort Dix provided the instructors who were sent to the Army Pictorial Center in New York. After one or two rehearsals, the instruction was recorded. Because of the conditions of pressure and speed combined with lack of time for more through rehearsals, some instructors from Fort Dix could not adapt to teaching by television, without showing symptoms of stage fright or becoming inhibited as compared with their classroom behavior. In these few instances, personnel available at the Army Pictorial Center were employed. These were very often enlisted men, members of the Television Division at the Pictorial Center, and skilled in assuming various roles. They used the material of the classroom instructor in their presentations, but generally did so with greater poise. Under the conditions imposed upon the production personnel, the 58 hours of television instruction closely resembled the classroom instruction in content and format. It was demonstrated, however, that within a relatively short time frame, 58 hours of existing basic training information could be converted to television.

Review-Preview Production.

A concurrent requirement was the production of material for Review-Preview. For this purpose, the mobile television facilities of the Army Pictorial Center were employed at the basic training center at Fort Dix, N. J. Their production mission was more difficult in many ways. Each Review-Preview session had to be outlined and planned so as to fit in with the existing day time schedule. Specific subjects to be reviewed and the number of times for review, selection of materials for preview, and the development of the shooting schedule were part of the requirement.

A format was established for Review-Preview in which an enlisted man, a Fort Dix instructor, served as a narrator throughout most of the 40 presentations. He soon developed as a personality for the trainees and addressed them on a "man to man" basis each night pointing out the importance of what they had already learned, leading into reviews of such learning, introducing speakers and outlining the value of such preview materials as trainees performing in various ways in later stages of training. Blended into this instructor's commentary, were various visual materials recorded by the mobile television crew at Fort Dix. This recording generally involved going out to a scene of activity such as trainfire, a drill field, grenade range, etc., and photographing the action as it took place for other companies going through training. This was essentially "newsreel" type of television recording.

A number of interesting problems occurred. For example, it was decided to record the action as it occurred on the grenade range. Because of the danger of flying materials from the exploding grenades, the television cameraman during this session used a shield to protect himself and his equipment. Troops were recorded as they went through various training activities and the resulting footage in many instances was judged to be among the most realistic ever seen.*

After all these materials were recorded, there remained the difficult task of editing and assembling them for Review-Preview. Here again restrictions of time placed great pressure upon production personnel. But the requirements were fulfilled.

*When a trainee pulls the pin on the grenade, he hurls the grenade, falls behind a protective barricade, and never sees the grenade explode. The television recording showed the trainees the completed action from pin pulling to explosion.

In judging which materials were to be reviewed and emphasized, an evaluation was made of the basic training program with respect to the amount of time spent on various subject matters, based on conferences held with Fort Dix training personnel. Review-Preview time was proportionately allocated to the different basic training subject matters. During the last week of basic training, Review-Preview was largely devoted to an overall review of everything which had occurred during the last eight weeks.

Among the materials included in preview-review were talks by the Deputy Commanding General. These were recorded in various training locations, using, for example, the background firing on the trainfire range as this officer spoke of the importance of rifle marksmanship. The flexibility of television in meeting the immediate requirements was also demonstrated. A temporary studio was established. Sudden changes in training schedules, news of events which occurred during the study, and interviews with the trainees, officers and cadre were recorded in this temporary studio.

Test Construction, Administration and Scoring.

Upon completion of basic training, standard Army tests are administered to measure trainee proficiency. These tests are of a performance nature and measure skills involving trainfire, map reading and orientation, grenade throwing and physical fitness. It is not Army policy to test daily basic trainee achievement in classroom subjects using paper and pencil tests.

Inquiry revealed the existence of a written test measuring overall knowledge of the first eight weeks of basic training. It had been developed by the Human Resources Research Office about 1956 and contained 150 multiple choice items. Because of changes in the Army training programs since that date many of the items were no longer applicable. There was a requirement, therefore, to construct appropriate tests to measure the learning achieved in the 58 hours of instruction selected in this study, as well as overall achievement.

Using the original HumRRO test as a guide, including its multiple choice format, new items were prepared based on the current ATP. Test questions were developed by research personnel in cooperation with the Fort Dix instructors. The resulting 240 item test was then used as one of the final tests used in measuring end of training knowledge. In addition, 25 individual tests were developed to measure daily instruction. The general procedure was to go through the lesson plan with the instructors and develop items based on lesson plan objective. These items were also in multiple-choice form. When the initial tests were developed, they were pretested with companies not involved in the study and changed

to clarify obscure phraseology and to insure that the alternatives did not contain any obviously false answers. It was decided to drop all questions which 80 percent of the trainees answered correctly as being too easy and not discriminating. However, items which very few of the trainees passed were retained unless inspection revealed some irrelevant reason for their difficulty.*

All the tests developed for this study went through these procedures and a total of 27 tests were devised. Throughout these tests, there were some items of a "pictorial" nature, e.g., they might show a picture of a map as the stem of the question and then the question would involve the trainee identifying some aspect of the map problem posed.

Another final test, however, labeled the pictorial test, was devised which consisted of 50 items entirely of this nature. Generally they showed the picture of an object and asked the trainee to identify it. The thought was that this type of test might more accurately measure the visual contribution of television. Figure 1 illustrates the types of items employed in the tests developed for this study.

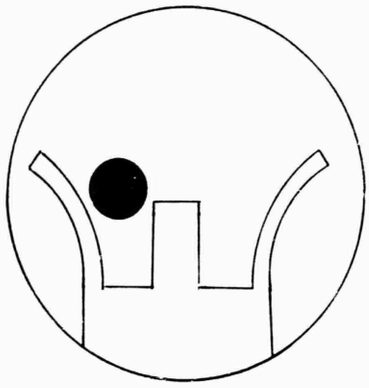
The two final tests were administered to the trainees in the eighth week of training, generally the last day. The items included in these final tests reflected the relative importance of various training objectives in basic training. This value was determined by the amount of time devoted to specific subjects as well as judgements by the Fort Dix instructional staff. It took about two hours to complete. The other tests were administered as soon as possible after the classroom instruction each day. Sometimes a particular test would measure two consecutive hours of classroom instruction. Some of the tests measured two or more hours of instruction which accounts for these being fewer than the hours of instruction used in this study.

*In some studies it is the procedure to establish arbitrary cutting off points for difficult items, e.g., deciding that items which were passed by fewer than 20 percent of the trainees would be rejected. This procedure was not followed in the present study based on the belief that the dropping of such items during the pre-testing phase might reduce the possibility of obtaining discriminations during the actual experimentation.

Comprehensive Basic Training Examination (cont'd)

60. In the drawing to the right, the shot fired with this sight picture would strike the target:

A. Low and to the right
B. High and to the right
C. High and to the left
D. Low and to the right

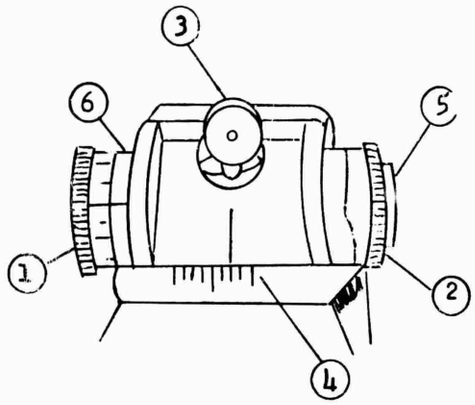


61. In the drawing to the right, the windage knob is located at point:

A. 2
B. 6
C. 1
D. 5

62. The number of clicks of windage on the rifle in this drawing is:

A. 2
B. 4
C. 6
D. 8



63. In the drawing to the right, the sight change necessary if the bullet strikes at point "1", with a range of 300 yds is:

A. 6 clicks left, and 9 clicks up
B. 2 clicks left and 3 clicks up
C. 3 clicks left and 4 clicks up
D. 1 click left and 3 clicks up

64. In the drawing to the right, the sight change necessary if the bullet strikes at point "1" with a range of 100 yds is:

A. 6 clicks left, and 9 clicks up
B. 2 clicks left, and 3 clicks up
C. 3 clicks left, and 4 clicks up
D. 1 click left, and 3 clicks up

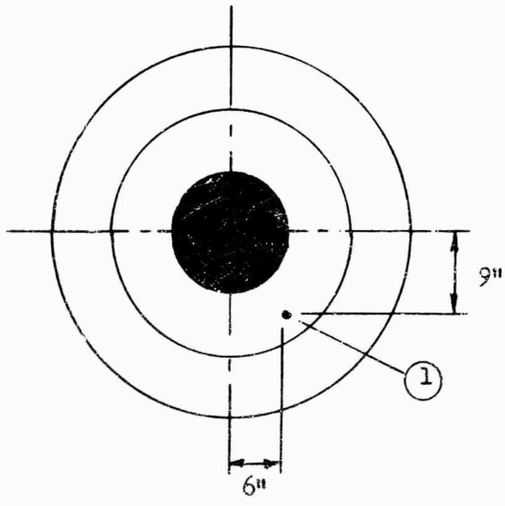


Figure 1. Multiple choice graphic items employed in study to measure trainee learning.

Test Administration and Scoring.

The daily tests were administered as soon as possible after instruction had been completed. With the assistance of company cadre, materials were passed out, tests monitored and collected. The tests were then taken by research personnel for processing. Figure 2 illustrates television company trainees being tested during study.

Figure 2. Television trainees undergoing tests during Fort Dix study.

IBM answer sheets and machine scoring were used. There was also periodic sampling of the accuracy of the scoring.

Selection of Experimental Companies.

The design of the study required that the trainees of the various companies employed be very similar to each other with respect to aptitude as measured by the Armed Forces Qualifying Test. Matching the trainees to achieve this similarity was accomplished in the following manner.

Each week trainees arrive at the Fort Dix reception center, usually in groups of 100 to 150, over a five day period. As each group arrives, it is tested (to include the AFQT) and then held until the Monday or Tuesday of "zero week." On Monday or Tuesday of "zero week" the trainees are formed into companies of about 220 men each.

The range of AFQT scores is 0 to 100. Trainees with AFQT scores of 31 or less were not included in the experimental companies. There was information that scores in this region might not be reliable, and that there are disciplinary problems with these trainees. In order not to jeopardize the major objectives of the study, this portion of the AFQT range was eliminated.

As the trainees became available, they were assigned to one of the two primary companies on the basis of their AFQT scores. In most instances there was direct matching, i.e., three men with 98 AFQT scores went to one company and another three with the same scores went to the other. When both companies were filled, further adjustments were made so as to achieve close matching. Finally, a coin was tossed to determine which would be the Television Company.

An important effect of equating trainees is that the precision of the study is increased. Trainees differ in their ability to learn. By equating for these differences through matching, the resulting test scores can more reliably be attributed to the types of instruction given to the trainees. In addition, separate analysis of trainee achievement based on aptitude could be made.

Description of Results.

Test scores are presented for the various companies which have been matched on the basis of AFQT scores. For the two primary companies, this matching was done prior to the beginning of training, as previously described. Other companies were post matched with the television company so as to equate for aptitude as measured by AFQT scores. The statistical significance of the difference between test scores is indicated. In keeping with previous studies, the .05 level of significance is used. This means that when marked "significant" the chance of a difference of a particular magnitude occuring is one in twenty times. Many of the differences were significant at the .01 level or better but these have not been identified other than as being "significant."

Summary of Preparations.

During the period of this study, February to August 1962, the following material were prepared and actions carried out:

a. 90 periods of instruction, ranging from 30 to 50 minutes, were recorded by television.

b. 27 multiple choice tests constructed and pre-tested.

c. 15,000 tests administered and scored.

d. 1,900 trainees tested.

Facilities and Equipment.

Most of the 58 hours of daytime instruction were recorded at the Army Pictorial Center, New York. In addition, mobile television units from the Center were also sent to Fort Dix. As previously described, these units were used to record Review-Preview materials. They also installed the television viewing facilities. A large classroom was used to present the daytime instruction to the television company. Six television receivers were placed about the room so as to permit viewing by the trainees. Figure 3 shows one section of the classroom with receivers installed.

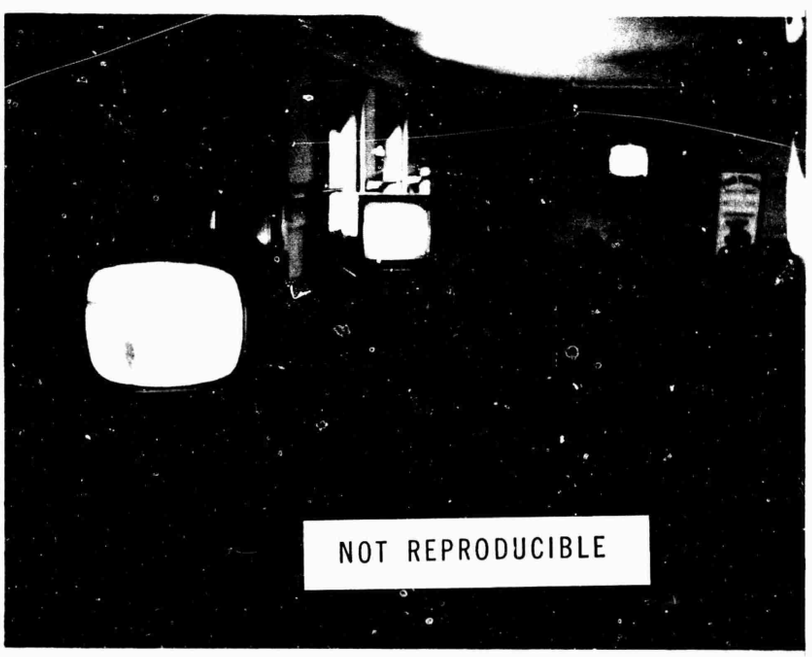


Figure 3, Partial view of television classroom and trainees receiving instruction.

The four barracks in which the television company trainees lived were equipped with television receivers also. Two receivers were placed on each floor. Both these receivers and those in the classroom were part of the closed circuit system installed. All television instruction was played back by a video tape recorder which was part of the mobile facilities. As a precaution against equipment failure, the daytime instruction had been recorded on film (kinescope) and film playback equipment was available. Figure 4 shows the mobile television units used at Fort Dix.

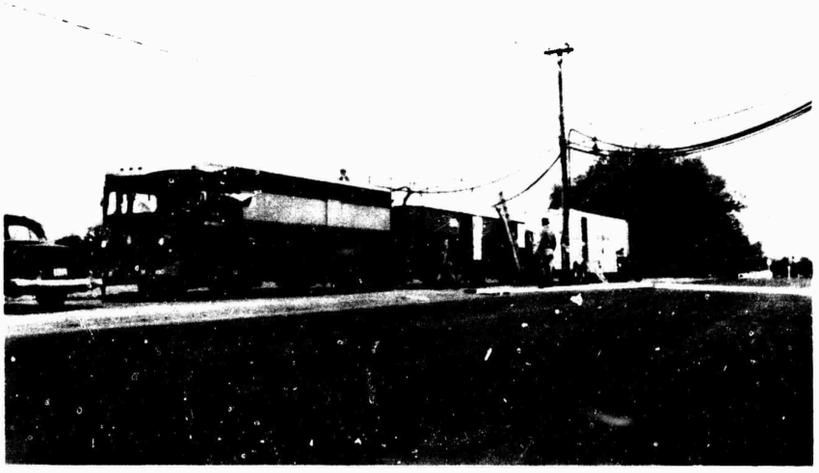


Figure 4. Mobile television units from the Army Pictorial Center in operation at Fort Dix.

In recording Preview materials, it was necessary to move the mobile facilities to the training sites of companies in later stages of training. The usual procedure was to record company activities as they occurred so as to avoid a "staged" effect. In some instances, however, to better illustrate a particular activity, arrangements were made for a rehearsed presentation. This occurred, for example, in illustrating the drill and

marching skills of company in its last week of training. Figure 5 is an illustration from this particular sequence and indicates the manner in which the television facilities were employed.

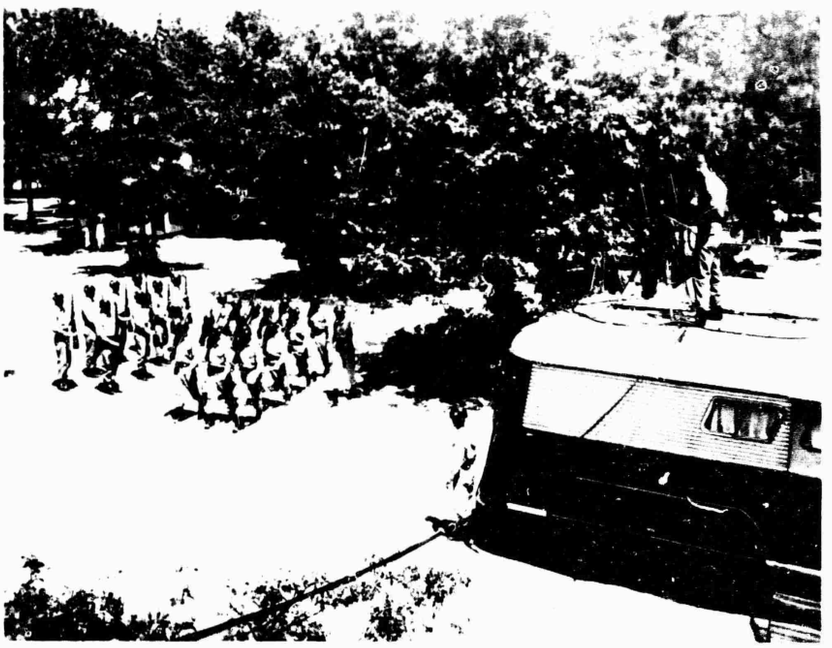


Figure 5. Recording "Preview" material of basic training company drilling in its last week of instruction.

RESULTS

RESULTS:

Immediate Testing.

The basic trainees were tested immediately after their classroom instruction in the 58 hours used in this study. Table 5 summarizes the results of this immediate testing.

TABLE 5

Mean Immediate Test Scores of Television (TV) and Conventional Company (C_1)

No. of Test Items	TD	Subject	N	TV Co.	C_1 Co.	Difference
10	1	Achievements & Traditions	163	6.50	6.10	.4*
10	2	"	144	6.96	5.49	1.47*
10	1	Military Courtesy	154	8.20	6.57	1.63*
10	2	"	165	6.39	6.97	.58**
15	3	"	146	11.23	9.49	1.74*
15	1	Code of Conduct	151	8.25	8.17	.08
20	2-3	"	153	14.46	15.44	.98**
20	1-2	Military Justice	160	8.68	9.77	1.09**
10	3	"	144	6.94	5.13	1.81*
15	4-5	"	154	9.83	8.17	1.66*
10	1	Supply Economy	155	5.16	5.12	.04
10	1	Troop Information	145	6.63	6.23	.40*
10	2	"	139	6.96	5.86	1.10*

* Difference significant in favor of TV Company.
** Difference significant in favor of C_1 Company.

TABLE 5 (contd)

Mean Immediate Test Scores of Television (TV) and Conventional Company (C1)

No. of Test Items	PD	Subject	N	TV Co.	C1 Co.	Difference
10	1	Personal Hygiene	155	6.48	6.58	.10
15	2	"	156	8.64	7.71	.93*
30	1-2	First Aid	165	20.03	20.72	.69**
25	1	C B R	155	13.93	15.17	1.24**
10	1	Intelligence	140	7.10	6.47	.63
10	2-3	"	136	7.07	7.02	.05
15	2	Trainfire	155	7.52	8.03	.51**
25	3	Trainfire	155	17.73	18.07	.34
20	19	Trainfire	151	14.50	14.46	.04
15	1	Land Navigation	154	10.53	10.41	.12
20	3	Land Navigation	153	15.16	14.67	.49*
20	1-2	Guard Duty	148	14.14	12.30	1.84*

* Difference significant in favor of TV Company.
** Difference significant in favor of C1 Company.

In the twenty-five comparisons, the television company's achievement is significantly better eleven times, while the conventional company is superior in six comparisons. The remaining eight comparisons indicate no significant differences between the two companies. These results indicate that in most of the comparisons the achievement of the television company is better than that of the conventional company. The superiority of the television company's achievement increases when an analysis is made of the achievement of the different aptitude groups. The results of this analysis are contained in Table 6.

Trainee Aptitude and Learning.

One of the interesting findings in the 1953 Fort Gordon study was that the lower aptitude groups learned more from television instruction than their counterparts did from conventional instruction. A similar analysis was performed in this study. Based on the four AFQT groups indicated in Table 1, the test achievements of the trainees in the two primary companies were computed. These are indicated in Table 6.

TABLE 6

Mean Immediate Test Scores of Trainees in Primary Companies according to AFQT Group

PD	SUBJECT	N	GROUP	TV CO.	C1 Co.	DIFFERENCE	
1	Achievements & Traditions	39	1	6.46	6.77	.31-	
		33	2	6.67	7.06	.39-	
		45	3	6.67	6.20	.47+	
		46	4	6.26	4.98	1.28+	*
2	Achievements & Traditions	32	1	7.32	6.00	1.34+	*
		29	2	7.31	5.76	1.55+	*
		41	3	6.88	5.53	1.34+	*
		42	4	6.50	4.86	1.64+	*
1	Military Courtesy	36	1	8.78	7.16	1.62+	*
		33	2	8.27	6.88	1.39+	*
		30	3	8.40	6.15	2.25+	*
		44	4	7.46	6.23	1.23+	*
2	Military Courtesy	39	1	6.77	7.59	.82-	
		33	2	6.76	7.33	.60-	
		46	3	6.09	6.70	.61-	
		47	4	6.13	6.47	.34-	
3	Military Courtesy	35	1	12.43	10.77	1.66+	*
		30	2	11.73	9.80	1.93+	*
		39	3	10.97	9.44	1.53+	*
		42	4	10.12	8.26	1.86+	*
1	Code of Conduct	37	1	9.51	9.92	.41-	
		39	2	8.24	8.55	.31-	
		41	3	8.29	7.81	.48+	
		44	4	7.16	6.80	.36+	

Significant.

TABLE 6 (Contd)

Mean Immediate Test Scores of Trainees in Primary Companies According to AFQT Group

PD	SUBJECT	N	GROUP	TV CO.	C1 CO.	DIFFERENCE	
2-3	Code of Conduct	38	1	14.79	16.29	1.50-	*
		29	2	15.35	16.07	.72-	
		40	3	14.58	15.53	.95-	
		46	4	13.54	14.28	.74-	
1-2	Military Justice	38	1	9.66	11.03	1.37-	*
		32	2	8.97	10.66	1.69-	*
		46	3	9.11	9.39	.28-	
		44	4	7.18	8.43	1.25-	*
3	Military Justice	34	1	7.29	5.35	1.94+	*
		29	2	7.35	5.55	1.80+	*
		40	3	6.90	5.33	1.57+	*
		41	4	6.39	4.44	1.95+	*
4-5	Military Justice	36	1	10.67	8.89	1.78+	*
		30	2	10.27	9.13	1.14+	
		42	3	9.45	7.67	1.78+	*
		46	4	9.22	7.44	1.78+	*
1	Supply Economy	37	1	5.92	5.81	.11+	
		32	2	5.13	5.63	.50-	
		43	3	5.07	4.65	.42+	
		43	4	4.61	4.61	.00	
1	Troop Information	33	1	7.18	6.91	.27+	
		30	2	6.80	7.27	.47-	
		43	3	6.65	5.98	.67+	*
		39	4	6.00	5.13	.87+	*
2	Troop Information	34	1	7.35	6.71	.64+	*
		27	2	6.96	6.52	.44+	
		37	3	6.95	5.76	1.19+	*
		41	4	6.66	4.83	1.83+	*
1	Personal Hygiene	39	1	6.85	7.26	.41-	
		31	2	6.90	6.77	.13+	
		41	3	6.42	6.39	.03+	
		44	4	5.91	6.02	.11-	

*Significant.

TABLE 6 (contd)

Mean Immediate Test Scores of Trainees in Primary Companies According to AFQT Group

PD	SUBJECT	N	GROUP	TV CO.	C1 CO.	DIFFERENCE	
2	Personal Hygiene	37	1	8.92	8.03	.89+	*
		31	2	8.42	7.94	.48+	
		45	3	8.58	7.49	1.09+	*
		43	4	8.63	7.51	1.12+	*
1-2	First Aid	38	1	21.61	22.95	1.34-	*
		34	2	21.38	22.38	1.00-	*
		45	3	20.02	20.07	.05-	
		48	4	17.33	18.40	1.07-	*
1	C B R	36	1	14.64	16.53	1.89-	*
		31	2	14.65	15.65	1.00-	
		43	3	14.42	14.63	.21-	
		45	4	12.42	14.89	2.47-	*
1	Intelligence	30	1	7.83	6.83	1.00+	*
		28	2	7.36	6.18	1.18+	*
		40	3	7.03	6.65	.38+	
		42	4	6.50	6.24	.26+	
2-3	Intelligence	31	1	7.39	7.81	.42+	
		25	2	7.12	7.20	.08-	
		38	3	7.11	6.68	.43+	
		42	4	6.76	6.64	.12+	
2	Trainfire	35	1	9.60	9.97	.37-	
		31	2	7.39	8.55	1.16-	*
		42	3	7.14	7.33	.19-	
		47	4	6.38	6.87	.49-	
3	Trainfire	35	1	20.20	20.54	.34-	
		31	2	17.77	19.79	2.02-	*
		43	3	17.14	17.58	.44-	
		46	4	16.37	15.63	.74+	
19	Trainfire	37	1	16.16	15.95	.21+	
		30	2	15.20	15.77	.57-	
		42	3	14.45	14.38	.07+	
		42	4	12.60	12.31	.29+	

*Significant.

TABLE 6 (Contd)

Mean Immediate Test Scores of Trainees in Primary Companies According to AFQT Group

PD	SUBJECT	N	GROUP	TV CO.	C1 CO.	DIFFERENCE	
1	Land Navigation	36	1	11.67	11.97	.30-	
		32	2	10.34	11.34	1.00-	
		43	3	10.95	9.86	1.09+	*
		43	4	9.30	8.95	.35+	
3	Land Navigation	35	1	17.83	16.97	.86+	
		32	2	16.09	16.38	.29-	
		43	3	14.51	13.26	1.25+	
		43	4	12.95	12.95	.00	
3	Trainfire	38	1	21.03	20.21	.82+	
		30	2	19.00	19.83	.83-	
		41	3	19.29	18.73	.56+	
		46	4	18.11	16.80	1.31+	
1	Land Navigation	37	1	10.89	10.95	.06-	
		28	2	9.82	10.39	.57-	
		41	3	9.85	9.20	.65+	
		44	4	8.27	7.75	.52+	
3	Land Navigation	33	1	17.06	16.36	.70+	
		27	2	15.63	15.96	.33+	
		38	3	14.84	12.68	2.16+	*
		42	4	12.41	11.24	1.17+	

*Significant.

In the 100 comparisons contained in Table 6, there are 50 each for the higher aptitude groups (1 and 2) and the lower aptitude groups (3 and 4). Further analysis indicates that for the higher aptitude groups, 16 of the significant differences are found in the television company, 9 in Company C1, with the remaining 25 comparisons non-significant. For the lower aptitude groups, 9 of the significant differences are found in the television company, 4 in the conventional company, with the remaining 22 comparisons non-significant. These results accentuate the superior performance of the television company. They also indicate that the high aptitude television trainees learned more from television than their counterparts did from conventional instruction, and that the lower aptitude trainees learned more from television than their counterparts did from conventional instruction.**

**The 1953 Ft Gordon study indicated that only the low aptitude people learned better from television than their counterparts did from conventional instruction. The high aptitude people learned equally well in either situation. In the present study, there was the additional finding that the high aptitude trainees learned more from television than from conventional instruction.

Effect of Review-Preview.

As indicated previously, daily classroom instruction was not mentioned in the Review-Preview until after it had been given. However, the Television Company trainees were given reviews of the instruction after it was given in the classroom. To measure the effects of this review, there was opportunity, prior to the end of basic training, to retest their achievement in seven of the original 25 measures listed in Table 5. These included subject matters in which the conventional company was superior to the television company in the immediate tests. It was discovered, after these interim tests had been administered, that the subject of Land Navigation had not been reviewed for the Television company at this time. The reviews occurred later. Therefore, the scores for this subject matter indicated in Table 7 probably reflect the effects of forgetting after original instruction. Similar tests were administered to the conventional company, which, of course, had not received the after hours review. These tests were given at various lengths of time after the original tests and this information, together with trainee tests scores is listed in Table 7. The "Days" column indicates the amount of time which elapsed between the first test and the retest.

TABLE 7

Mean Test Scores Achieved by Primary Companies Before and After Exposure by TV Company to Review

(Bold Face Type Indicates Retest Scores)

Subject	PD	Days	TV Co.	C1 Co.	Days	Difference
Military Justice	1-2		8.68	9.77		1.09**
MILITARY JUSTICE	1-2	20	9.99	8.29	21	1.70*
First Aid	1-2		20.03	20.72		.69**
FIRST AID	1-2	43	18.59	18.09	44	.50
CBR Warfare	1		13.93	15.17		1.24**
CBR WARFARE	1	31	14.55	13.75	31	.80*
Trainfire	2		7.52	8.03		.51**
TRAINFIRE	2	40	9.75	8.77	43	.98*
Trainfire	3		17.73	18.07		.34
TRAINFIRE	3	19	19.31	18.74	18	.57*
Land Navigation	3		15.16	14.67		.49*
LAND NAVIGATION	3	50	14.79	13.75	34	.23
Land Navigation	1		10.53	10.41		.12
LAND NAVIGATION	1	41	9.64	9.41	43	.23

* Difference significant in favor of TV Company.
**Difference significant in favor of C_1 Company.

In the seven comparisons, the retest scores show the learning of the TV Company to be equal to or significantly better than that of Company C1. The original tests had shown the TV Company to be significantly poorer in four of the subject matters. This is the first indication that the Review-Preview procedures enhanced the performance of the Television company. Although not all of the comparisons listed in Table 5 were repeated, it is a reasonable presumption that at this stage the performance of the Television company is superior to that of the conventional company, C_1. The beneficial effects of review upon learning are well known. The general problem is that of providing review opportunities inexpensively and without additional instructor requirements. The review-preview procedures employed in this study suggest that recorded television material can solve this problem.*

Test Achievement of Conventional Company C2.

The trainees of the TV company and the conventional company (C1) were told that they were in a comparative study situation.** It was believed that this knowledge might result in a level of basic training instruction not typical of that ordinarily found. To check on this belief, tests were given to another conventionally trained company at Fort Dix, which had not been told it was participating in a study.

The second conventional company, C2, was undergoing training at the same time as the TV and C1 companies. It was physically distant from these two companies and the probability of contact with them was remote. At about the same time the TV and C1 companies were tested, C2 company was tested. It was only possible to administer seven tests to this company. Table 8 lists the comparative test results among the three companies.

* The total effects of the Review-Preview procedure would be revealed in the end of training final tests. As will be seen these effects were even more extensive than those described in Table 7.

**It is difficult to conceal this type of information from the trainees. The mere giving of tests which other companies were not receiving would be enough to arouse the thought of differential treatment. Therefore, the company commanders of the television and conventional companies informed their troops that they were participating in a study aimed at improving their training.

TABLE 8

Mean Test Scores Achieved by TV, C1 and C2 Companies, Fort Dix

Subject	PD	N	TV	C1	C2
Code of Conduct	2-3	82	15.06	15.84	15.50
Supply Economy	1	76	5.50	5.12	6.32
Troop Information	2	73	7.32	5.75	4.52
CBR Warfare	1	88	14.22	15.43	15.22
Trainfire	2	90	7.87	8.20	8.17
Trainfire	3	91	18.28	18.44	18.17
Guard Duty	1-2	89	14.27	12.89	12.33

These results reveal little difference among the three companies in test achievement for the seven subject matters tested. Therefore, the belief that conventional company C1 was performing at level higher than that ordinarily achieved at Fort Dix is not supported by these tests. Later results, based on other test data, do support the belief. A possible explanation is that the immediate test results contained in Table 8 occur too early to detect company C1's better performance and that this was better revealed in the final tests. In addition, the final tests measured more areas of information than those in Table 8.

End of Training Test Results.

Two tests were administered to measure overall achievement at the end of the first eight weeks of basic training. The first of these was a 240 item multiple choice test and the second, a fifty item pictorial test described earlier. These tests were given to the primary companies as well as to a number of secondary conventional companies. These companies were located at Fort Dix, at Fort Jackson, South Carolina and Fort Ord, California.

Basic training at all these installations is guided by a common Army Training Program. Therefore, comparisons would reveal the relative effectiveness of the training standardized for the television company at Fort Dix as well as for the various conventional companies at these installations. There was opportunity to obtain information on the question of whether Company C1 was performing at an atypical level. The overall picture of training effectiveness produced by these inter-installation comparisons would also bear on the interpretation of the present study's results.

The first of the two final tests administered was the 240 item multiple choice test. The performance of the companies taking this test is described in Table 9.

TABLE 9
Mean Scores Achieved by Basic Training Companies on Final 240 Item Test

N	Company	Score	%	TV Company	Score	Difference	%
156	C1 (Ft Dix)	135.89	56.62	146.83	61.17	10.94*	4.55
104	C3 (Ft Dix)	128.57	53.57	145.43	60.41	16.86*	7.02
117	C4 (Ft Ord)	134.32	55.96	151.41	63.08	17.09*	7.12
95	C5 (Ft Ord)	116.35	48.47	139.59	58.16	23.24*	9.68
128	C6 (Ft Jackson)	120.34	51.41	146.58	61.07	26.24*	10.93
80	C7 (Ft Jackson)	120.76	50.31	142.50	59.37	21.74*	9.05
117	C8 (Ft Dix)	132.54	55.22	145.53	60.54	12.99*	5.41

*Significant.

The results indicate that the test achievement of the television company is significantly higher than any of the conventional companies. The television company, in contrast to the earlier results of the immediate tests, now demonstrates clear superiority in final test achievement over the primary conventional company C1. This superiority increases, as will be shown later, when analysis is made of the test performance of different aptitude groups . Since the immediate test scores did not reveal differences of this magnitude, the presumption is that the after hours review-preview procedure was the major reason for the final test score superiority of the television company.**

**It will be recalled that the review-preview procedures did not go into the specifics of the next day's classroom instruction and thus would not influence the immediate test scores of this instruction and the effects of later specific review would presumably be measured by the final tests.

Company C3 received its training about the same time as the two primary companies. It was physically distant from these two companies and contact among trainees was considered unlikely. At the end of the basic training cycle, without prior notice, the final tests were administered to this company. Its performance was significantly poorer than that of Company C1 both on this test and the pictorial test to be described later. These results suggest that the performance of primary company C1 may have been higher than that ordinarily achieved at Fort Dix.

Company C8 was the basic training company which followed the Television company when the latter completed its training. The same cadre trained both companies. In overall mean scores, its achievement was closer to the two primary companies than to the other companies. One may speculate upon a carry over effect upon the cadre's performance. However, there are some important differences in the trainees' achievement when analysis by aptitude is made. As in previous analyses, it indicates television effects not revealed in the group scores. However, an important implication of the scores described in Table 9 is that the level of instruction standardized on video tape for the television company was superior, even without any effort at further improvement, to the instruction given to the other companies at Fort Dix, Fort Ord and Fort Jackson.

Trainee AFQT and Performance on 240 Item Final Test.

As described earlier, the availability of AFQT scores for each of the trainees permitted analysis of the final test results for trainees falling into each of the four AFQT categories established in this study. Table 10 describes these results.

TABLE 10

Mean Test Scores Achieved on Final 240 Item Test according to AFQT

COMPANY	NO.	GROUP	MEAN SCORES	TV CO. GRP MEAN SCORES	DIFFERENCE*
C1	39	1	149.90	162.77	12.87
	30	2	144.40	150.77	6.37
	42	3	133.52	144.55	11.03
	45	4	120.27	132.51	12.24
C3	25	1	141.04	162.16	21.12
	30	2	129.53	142.60	13.07
	26	3	123.85	144.35	20.50
	23	4	119.09	132.13	13.04
C4	37	1	145.89	164.51	18.62
	26	2	137.62	150.35	12.73
	30	3	128.00	149.67	21.67
	24	4	120.79	134.54	13.75
C5	12	1	144.50	155.17	10.67
	15	2	129.87	154.20	24.33
	31	3	115.06	140.42	25.36
	37	4	102.81	127.92	25.11
C6	28	1	138.71	161.82	22.11
	29	2	122.48	152.16	29.69
	40	3	113.00	143.93	30.93
	31	4	111.23	131.00	19.77
C7	10	1	141.80	163.00	21.20
	15	2	134.80	153.27	18.47
	25	3	123.36	141.08	17.72
	30	4	104.57	131.47	26.90
C8	21	1	146.86	160.57	13.71
	32	2	133.59	149.22	15.63
	34	3	132.56	144.50	11.94
	42	4	124.55	136.02	12.99

*All differences significant.

The results described in Table 10 support those found previously for the immediate tests -- both high and low aptitude trainees learned better from television than their counterparts did from conventional instruction.** Of interest is the finding that these results hold for company C8 also. This company was trained by the same cadre as the TV company but without television.

**The 1953 Fort Gordon study found this effect only for the low aptitudes trainees. The achievement of the high aptitude trainees in that study was not related to method of instruction.

These results indicate that television, as employed in this study, was the key factor in the learning superiority of the television company and that the enhancement effected both low and high aptitude trainees. But, from a teaching viewpoint, there is more to be extracted from the results indicated in Table 10. Inspection reveals that the performance of the lower aptitude television groups (Groups 3 & 4) is comparable in most instances to the higher aptitude conventionally taught trainees (Groups 1 & 2). To facilitate this comparison, these groups have been extracted from Table 10 and described in Table 11.

TABLE 11

Mean Scores of higher aptitude groups of Conventional Companies compared to lower aptitude groups of TV Company

Company	Group	Mean Score	Group	TV Company	Difference
C1	1	149.90	3	144.55	5.35
	2	144.40	4	132.51	11.89*
C3	1	141.04	3	144.35	3.31
	2	129.53	4	132.13	2.60
C4	1	145.89	3	149.67	3.78
	2	137.62	4	134.54	3.08
C5	1	144.50	3	140.42	4.08
	2	129.87	4	127.92	1.95
C6	1	138.71	3	143.93	5.22
	2	122.48	4	131.00	8.52
C7	1	141.80	3	141.08	.72
	2	134.80	4	131.47	3.33
C8	1	146.86	3	144.50	2.36
	2	133.59	4	136.02	2.43

*Significant.

In 14 comparisons, only one, Group 2, Company C1, is significantly higher than the low aptitude group of the television company. The remaining comparisons indicate no significant differences between low aptitude television trainees and the high aptitude conventional trainees. From a training viewpoint, these findings are probably the most important in the study. They indicate that an important problem in Army training, the teaching of lower aptitude personnel, may be facilitated by the use of the television procedures employed in this study.

Results of the Final Pictorial Test.

The second final test, the fifty item pictorial test, was administered to the trainees at about the same time as the 240 item test. Although the latter test contained some pictorial items, the 50 item test used this type of item exclusively. Table 13 describes the performance of the various companies on this test.

TABLE 13

Mean Scores Achieved on Pictorial Test by Seven Basic Training Companies

N	Company	Score	TV Co. Score	Difference
156	C1 (Ft. Dix)	34.04	35.20	1.16*
104	C3 (Ft. Dix)	31.67	34.89	3.22*
117	C4 (Ft. Ord)	34.31	36.46	2.15*
95	C5 (Ft. Ord)	31.12	34.46	3.34*
128	C6 (Ft. Jackson)	30.79	35.70	4.91*
80	C7 (Ft. Jackson)	30.25	34.45	4.20*
129	C8 (Ft. Dix)	33.92	35.38	1.46*

*Significant.

The pictorial test items emphasized recognition learning. It is widely believed that verbal tests do not adequately asure the visual learning produced by such devices as television. While the validity of this belief cannot be determined from the results of this study, the pictorial test used did minimize verbal comprehension and perhaps measured another aspect of trainee learning. In any event, results in Table 13 support previous findings and indicate the superiority of the television company's learning as compared with the conventional companies.

Analysis was also made based on trainee AFQT group achievement. These scores are indicated in Table 14.

TABLE 14

Mean Score Achieved on Pictorial Test by Basic Training Companies based on Trainee Aptitude

Company	Group	Mean Scores	TV Co. Mean Score	Difference
C1	1	35.64	38.49	2.85*
	2	35.00	35.10	.10
	3	33.79	35.17	1.38*
	4	32.24	32.44	.20
C3	1	32.76	38.28	5.52*
	2	33.07	33.50	.43
	3	32.12	34.61	2.49*
	4	33.17	33.35	.18
C4	1	36.59	39.11	2.52*
	2	34.62	35.50	.88
	3	33.67	36.90	3.23*
	4	31.25	32.88	1.63*
C5	1	34.50	38.67	4.17*
	2	33.33	36.47	3.14*
	3	31.03	35.03	4.00*
	4	29.22	31.81	2.59*
C6	1	33.89	38.79	4.90*
	2	31.07	35.86	4.79*
	3	30.63	35.70	5.07*
	4	27.94	32.77	4.83*
C7	1	33.20	38.10	4.90*
	2	32.80	35.20	2.40*
	3	30.52	34.88	4.36*
	4	27.77	32.50	4.73*
C8	1	34.86	38.95	4.09*
	2	35.00	35.63	.63
	3	33.62	35.71	2.09*
	4	32.88	33.14	.26

*Significant.

These results also support previous findings that both high and low aptitude trainees learned better from television than conventional instruction. Finally, a comparison was made between low aptitude television trainees and high aptitude conventional trainees. These results are contained in Table 15.

TABLE 15

Mean Scores of higher aptitude groups of Conventional Companies compared to lower aptitude groups of Television Company

Company	Group	Mean Score	Group	TV Company	Difference
C1	1	35.64	3	35.17	.47
	2	35.00	4	32.44	2.56*
C3	1	32.76	3	34.61	1.85
	2	33.07	4	33.35	.28
C4	1	36.59	3	36.90	.31
	2	34.62	4	32.88	1.74
C5	1	34.50	3	35.03	.53
	2	33.33	4	31.81	1.52
C6	1	33.89	3	35.70	1.81
	2	31.07	4	32.77	1.70
C7	1	33.20	3	34.88	1.68
	2	32.80	4	32.50	.30
C8	1	34.86	3	35.71	.85
	2	35.00	4	33.14	1.86

*Significant.

In seven of the 14 comparisons, the performance of the TV Companies lower aptitude groups was equal to or better than that of the conventionally trained companies. In the remaining comparisons, the differences are small. These findings support those of the master test in indicating that the achievement of the lower aptitude television groups was very similar to that of the higher aptitude conventional trainees.

Two major tests involved a "county-fair" and Trainfire. The "county-fair" consists of a number of stations at which the trainees are tested in various skills involving weapons, map reading, etc. The Trainfire test refers to the present system of measuring rifle marksmanship. Table 16 summarizes the scores on these tests achieved by the two primary companies and a second conventional company C3.

TABLE 16

Scores Achieved on Standard Performance Tests by TV Company, Company C1, and Company C3

Company	County Fair Score	% Qualified	Trainfire Score	% Qualified
TV	86.71	100.00	56.84	100
C1	86.13	99.08	55.11	97.27
C3	84.32	97.58	46.36	90.87

With one exception, these tests do not reveal any significant differences among the three companies. The 100% qualification on Trainfire, based on Fort Dix experience, occurs about once in every 100 companies tested. There is the suggestion that the Review Preview may have played an important role in these achievements. This is based on the results of the same tests administered to the two companies which followed the primary companies in training and were taught by the same company cadre. These are described in Table 17.

TABLE 17

Scores Achieved on Standard Performance Tests by Later Companies trained by same cadre as primary companies and without television One Cycle later

Company	County Fair Score	% Qualified	Trainfire Score	% Qualified
TV (2)	85.70	100	42.06	72.22
C1 (2)	77.25	88.89	46.83	86.39

There is little change in the performance of the company trained by the TV cadre on the County Fair tests, but a significant reduction in Trainfire performance. Company C1 (2) trained by the same cadre as C1 shows a reduction in the County Fair score but not in Trainfire. As previously indicated, because of the unknown contributions of cadre instruction, these results do not lend themselves to unequivocal interpretation.

Administrative Factors.

In addition to trainee learning, one of the major objectives of this study was to determine the effect of television upon instructional requirements and costs. It should be stated at the outset that while a determination of this nature was made, the estimates made are considered to be conservative and to understate magnitude of the savings achieved.

It will be recalled that every time the television company entered a classroom it received its instruction by means of a television recording. In the 58 hours of television instruction presented, at least one instructor and some or all of his assistants were not required to teach the television company. Usually, only one instructor was involved. In other subject matters, such as First Aid, there is a principal instructor and a number of assistants. The concept of instructional manhours is used. Instead of saying, for example, that 165 instructors were replaced by television, the statement is made that requirements for 165 instructional man hours were eliminated by the use of television.

Earlier it was indicated that 82 hours of instruction were judged suitable for television presentation. These subjects are listed in Table 18. A determination was then made of the number of instructor man hours needed to present these 82 potential television hours by conventional means. The number of instructor man hours actually saved during the course of this study was determined, and the number of hours which could be saved by television if all 82 hours of instruction were used, was calculated for one company. Table 18 summarizes this information.

TABLE 18
INSTRUCTIONAL MANHOUR FACTORS

SUBJECT	CONVENTIONAL REQUIREMENTS	1 CO TV SAVINGS ACTUAL	1 CO TV SAVINGS POTENTIAL
CG Orientation	16		16
CO Orientation	1		1
Enlistment Orientation	1	1	1
Safety	4		4
Achievements & Traditions	4	4	4
Military Courtesy	8	8	8
Character Guidance	8	8	8
Code of Conduct	4	4	4
Military Justice	14	14	14
Supply Economy	2	2	2
Troop Information	4	4	4
Field Sanitation	8	8	8
First Aid	12	12	12
CBR Warfare	21	9	21
Guard Duty	10	10	10
Inspection & Training Evaluation	5	5	5
Intelligence	8	8	8
Land Navigation	6	6	6
Individual Day & Night Training	12		12
Marches and Bivouacs	12		12
Rifle Squad Tactical Training	12		12
Grenades	9		9
Trainfire M-1 & M-14	108	58	58
Night Fire and Night Vision	4		4
Hand to Hand Combat	3		3
Land Mine Warfare	4		4
Counter Insurgency	4	4	4
	304*	165**	254***

* Instructional manhours required to conventionally present 82 Potential Television hours.

**Instructional manhours actually saved by television presentation during the Fort Dix project.

***Instructional manhours could be saved by television presentation in one company during one basic training cycle under the experimental ATP.

The reductions in instructional manhours described in Table 18 may be translated into monetary savings. The average rank of the faculty instructors at Fort Dix is E5. Based on AR 35-247, dated 3 July 1958, "Military Compensation Rate Tables," the hourly rate for an E-5, which includes allowances (cash and in kind), is $1.89. The cost of such support factors as attendance at a two week instructional methods course and assistance provided by non-instructional personnel was estimated at 54 cents an hour, thus providing an hourly instructional cost of $2.43. Multiplying this figure by the number of hours which could be presented by television, 254, (see table 18), results in the figure of $617.22. This represents the sum saved by the use of television for one company by the elimination of 254 hours of conventional instructional requirements. Based on an average company strength of 225 trainees, average savings per trainee is $2.74.

Discussion of Results.

Two major concerns of this study were the effects upon trainee learning produced by the television instruction methods used and the administrative and cost factors related to the use of television in basic training. The study results provided information on both of these objectives.

The learning of the Television company was superior to that of the conventionally trained basic companies. It is the nature of this superiority and some of the reasons for its occurrence which is of particular interest. To begin with, the television instruction was based primarily upon existing classroom instruction with respect to content, very often using a classroom instructor. In a number of hours, an attempt was made to introduce a more interesting introduction, brief rest pauses about half way through the instruction and superimposures of key points. Closeups of small parts were employed frequently. Under the conditions of pressure which existed, however, it was not possible to treat each of the 58 hours of instruction in a systematic fashion in the use of these techniques. More important, there was no opportunity to go back and change the instruction based on trainee learning.

Despite these restrictions, in most of the comparisons made by the immediate tests, the television company's learning was superior. What is of importance, however, was the demonstration that the Review-Preview procedure could be used to improve trainee learning deficiencies following classroom instruction. In subject matters where the television trainees did not do as well as the conventional company trainees, it was demonstrated that review of the material could raise the achievement of the television trainees so that initial deficiencies could be eliminated and the effects of forgetting reduced.

These interim test results of the effects of Review Preview were more forcefully repeated by the final tests. The learning of the television company was superior to that of the conventional companies on these tests. The nature of this superiority was revealed in an important way by the analysis of trainee test performance based on aptitude or AFQT scores.

The immediate test scores had previously provided evidence that both high and low aptitude groups learn better from television than their counterparts did from conventional instruction. These findings were repeated with greater margin in the final tests. It was pointed out that while such results had been found in the 1953 basic training study for low aptitude trainees, it had never been demonstrated for higher aptitude trainees. Probably the most important finding from these aptitude analyses was that the end of basic training achievement ofthe low aptitude television trainees was as good as that of the high aptitude conventional trainees. The important problem of training low aptitude personnel may find new approaches or solutions by the use of television.

The Review-Preview procedure was also developed under conditions which did not permit refinements or corrections. An attempt was made to inject a reasonable amount of review materials as well as previews of forthcoming events. But it is safe to assume that there are more effective combinations of review materials as well as uses of preview in basic training. In an ongoing training situation, these adjustments could be tried out and evaluated. Nevertheless, under these conditions, the review-preview procedures seemed responsible for the superior learning of the television company and presented a means for improving basic training.

It is possible to produce and standardize television instruction at a more effective level than that used in this study. One approach would be to select leading instructors within the U. S. Army to teach basic training subjects by television, e.g., an instructor from the Judge Advocate School teaching Military Justice. Once produced, this television instruction could be used by all basic training centers and achieve a standardized and uniformly high level of training effectiveness. Another method would be to utilize available instructors to record the initial instruction, as was done in this study. Then by testing the trainees, modify and redo the televized instruction so as to obtain an effective level of instruction.

While the present study was carried out within the framework of the existing ATP, it soon became apparent that the important advantage afforded by television would be the revisions possible in current basic training programs. For example, it would be possible to present all formal classroom instruction to the trainees in their barracks. This training could also be scheduled so that it appeared in the morning and left the rest of the training day free for physical conditioning and learning of field skills. In still another application, it seemed possible to use the after hours television in the barracks to present information and education materials related to such subjects as the nature of communism in a more effective manner than is now possible. In the proposed application, new trainees would be exposed, over an eight week period, to many hours of filmed and videotaped information on this subject. From the viewpoint of influencing trainee attitudes and information, this approach should be superior to the spradic exposures to films on this subject which is now practiced. In any event, the availability of a television training facility and an imaginative approach have already proved their value to other areas of Army training and should do the same for basic training.

Summary of Results.

The results of the study may be summarized as follows:

(1) The comparisons between the television company and the primary conventional company, based on immediate test scores indicated:

a. Television instruction was in most comparisons more effective than conventional instruction.

b. Television instruction was more effective both for low and high aptitude groups.

c. Prior to the end of basic training, Review-Preview had already eliminated deficiencies indicated by the immediate tests for the TV Company.

(2) Comparisons between the television company, (based on final test scores), with conventional companies indicated:

a. The learning of the television company was superior to that of the conventional companies.

b. The learning of the lower aptitude television trainees was at least as effective as the learning of the higher aptitude conventional company trainees.

c. The superior performance of the television company appears attributable to the review-preview procedure.

(3) Administratively, the use of television eliminated requirements for 165 man hours of live instruction. It was determined that this elimination could be extended to 254 hours which could be presented by television.

(4) Additional advantages of television were:

a. Standardization of training at an effective level.

b. Mobilization requirements for additional instructors are reduced or eliminated.

c. New training requirements can more easily be incorporated, e.g., review opportunities, new subject matters, changes in scheduling, etc.